RENESAS

PCA7438F-64A
PCA7438H-64A

PROM Programming Adapters for M38C13E6FP, M38C13E6HP

User's Manual

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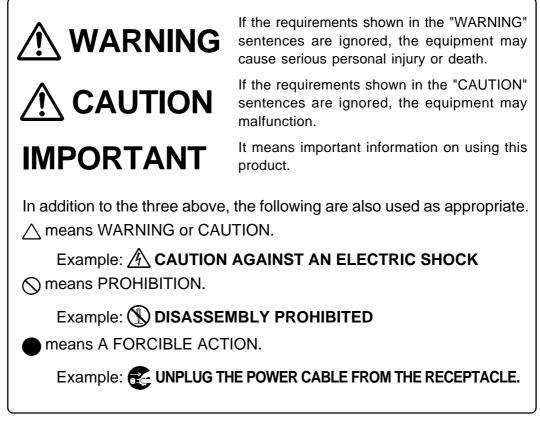## To Use the Product Properly

Precautions for Safety:

- Either in the User's Manual or on the product, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.

- Their graphic images and meanings are given in Chapter 1, Precautions for Safety. Be sure to read this chapter before using the product.

1. Precautions for Safety

In this User's Manual, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.

This chapter describes precautions which should be taken in order to use this product safely and properly. Be sure to read this chapter before using this product.

1.1 Safety Symbols and Meanings

⚠ **WARNING**   If the requirements shown in the "WARNING" sentences are ignored, the equipment may cause serious personal injury or death.

⚠ **CAUTION**   If the requirements shown in the "CAUTION" sentences are ignored, the equipment may malfunction.

IMPORTANT   It means important information on using this product.

In addition to the three above, the following are also used as appropriate.

△ means WARNING or CAUTION.

    Example: ⚡ **CAUTION AGAINST AN ELECTRIC SHOCK**

◯ means PROHIBITION.

    Example: 🚫 **DISASSEMBLY PROHIBITED**

● means A FORCIBLE ACTION.

    Example: 🔌 **UNPLUG THE POWER CABLE FROM THE RECEPTACLE.**

The following pages describe the symbols "WARNING", "CAUTION", and "IMPORTANT".

⚠ WARNING

Warnings for Use Environment:

- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

- Select the proper programming mode of the PROM programmer.

⚠ CAUTION

Cautions in Handling This Product:

- Do not disassemble or modify this product. Personal injury due to electric shock may occur if this product is disassembled or modified.

- Use caution when handling this product. Be careful not to apply a mechanical shock such as falling, etc.

- Do not directly touch the connector pins of this product.

- Be careful with the static electricity when handling this product and the MCU.

Caution in Keeping This Product:

- When not using this product for a long time:

    (1) Attach the connector pins of this product to the conductive sponge.

    (2) Put it into a conductive polyvinyl, and keep it in the package case shipped from the factory.

    (3) Store it in the place where humidity and temperature are low and direct sunshine does not strike.

IMPORTANT

When Using this Product:

- Attach this product to the IC socket on the PROM programmer properly.

- Insert the MCU to the IC socket of this product properly.

- Be sure to set the programming area as described in this user's manual.

- Do not use the PROM programmer's device identification code readout function.

2. Introduction

The PCA7438F-64A and PCA7438H-64A are PROM programming adapters for 8-bit 38000 Series 38C1 Group MCUs. These adapters are tools that can be used to write a program into internal PROM of MCUs using a commercially available PROM programmer.

This manual describes the specifications and the operation of PCA7438F-64A/PCA7438H-64A.

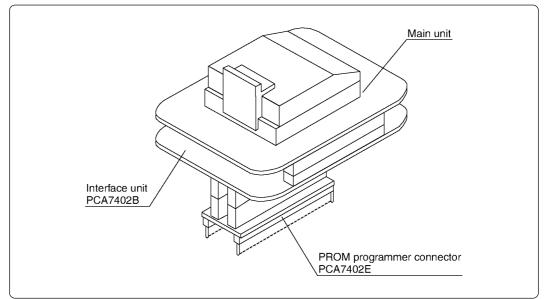Figure 2.1 shows the external view and the constituent parts of them.

Figure 2.1 External view of PCA7438F-64A/PCA7438H-64A and their constituent parts

2.1 Things to Check When Unpacking

PCA7438F-64A/PCA7438H-64A consist of the following items. Check to see that it contains all of the components shown in Table 2.1.

Table 2.1 Contents of PCA7438F-64A/PCA7438H-64A

Main unit	PCA7438F-64A/PCA7438H-64A
Interface unit	PCA7402B
PROM programer connector	PCA7402E (32-pin)
User's Manual	This user's manual

If any part is missing or there is any doubt about your product package, contact your local distributor.

3. Specifications

Tables 3.1 and 3.2 list the specifications of the PROM programming adapters.

Table 3.1 Common specifications of the PROM programming adapters

Operating clock frequency		1 MHz (Supplied by the ceramic oscillator mounted on the main unit)
Power supply		Supplied from the Vcc of the PROM programmer
Board configuration	Main unit	A programmable MCU mounted (IC socket for the MCU mounted)
	PCA7402B	Interface board (buffer IC mounted) (Connected by two rows of standard-pitch 18-pin connectors and two rows of standard-pitch 16-pin connectors to the upper and lower boards)
	PCA7402E	Board to be connected to the PROM programmer (Standard-pitch 32-pin pin-header to be connected to the PROM programmer mounted)

Table 3.2 Each specification

PCA7438F-64A	MCU	M38C13E6FP (64-pin 0.8-mm-pitch QFP)
	IC socket	IC51-0644-824-6 (made by Yamaichi Electronics Co., Ltd.)
PCA7438H-64A	MCU	M38C13E6HP (64-pin 0.5-mm-pitch LQFP)
	IC socket	IC51-807.KS-12333 (made by Yamaichi Electronics Co., Ltd.)

4. How to Write the Program

This chapter describes how to write programs using a PROM programmer. For details on how to operate the PROM programmer, refer to the user's manual of the PROM programmer.

4.1 Programming Procedures

Follow procedures (1) to (7) to write programs into the MCU.

(1) Read the program into the PROM programmer.

▼

(2) Attach the adapter to the PROM programmer. (See Section 4.2)

▼

(3) Insert the MCU into the adapter. (See Section 4.3)

▼

(4) Specify the programming area of the MCU using the PROM programmer. (See Section 4.5) ^{*1}

▼

(5) Using the PROM programmer's erase check function, check whether data can be written into the programming area of the MCU. ^{*2}

▼

(6) Write the program into the programming area of the MCU using the PROM programmer. ^{*2}

▼

(7) Verify the programming area of the MCU using the PROM programmer to check whether the program is written into the MCU correctly. ^{*2}

^{*1} **Be sure to set the programming area. Otherwise the mode's shift to the programming mode may not be performed successfully. The erase check function etc. may not also be performed completely.**

^{*2} Some PROM programmers perform the steps (5) through (7) automatically.

4.2 Attaching the Adapter to a PROM Programmer

As shown in Figure 4.1, attach the pin No. 1 of the PCA7402E PROM programmer connector (standard-pitch 32-pin pin-header mounted) to the pin No. 1 of the IC socket of the PROM programmer.

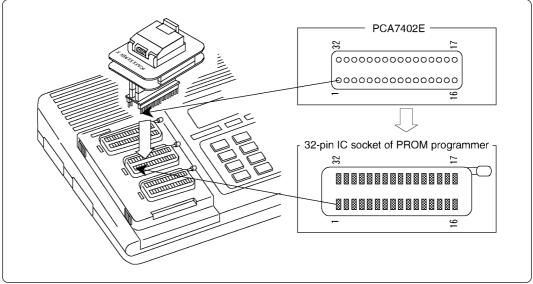> **Be careful when attaching the adapter because incorrect insertion can cause fatal damage to the MCU.**

Figure 4.1 Attaching the adapter to the PROM programmer

4.3 Inserting an MCU into the Programming Adapter

As shown in Figure 4.2, insert the MCU into the IC socket, with the pin No. 1 of the MCU matched to the pin No. 1 of the IC socket on the PCA7438F-64A/PCA7438H-64A.

> **Be careful when inserting the MCU because incorrect insertion can cause fatal damage to the MCU.**
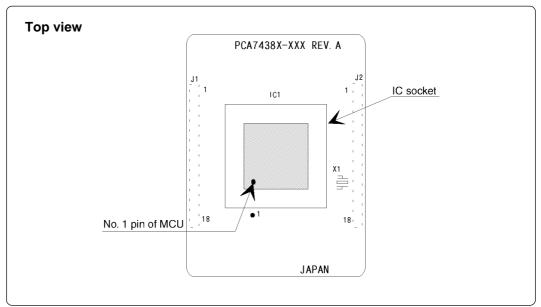

Figure 4.2 Inserting an MCU

4.4 Precautions When Handling the Adapter

Do not touch the connector in the IC socket and the pins on the PROM programmer connector, otherwise it cause an electrical insulation failure because of dirt.

When not using, attach the connector pins of this product to the conductive sponge as it was shipped from the factory.

4.5 Setting a Programming Area

When writing the program into the MCU, be sure to set the programming area. And also, specify its device of the PROM programmer.

Table 4.1 Programming area

MCU type	MCU area	PROM programmer		Programming area of the MCU
		Device name	Programming area	
M38C13E6FP M38C13E6HP	Internal ROM area	M5M27C101	$A080_{16}$ - $FFFD_{16}$	$A080_{16}$ - $FFFD_{16}$

5. Recommended PROM Programmers

The PROM programmers listed in Table 5.1 are recommended for this product. Using the actual products, we have verified that these PROM programmers can be used to write programs without problem. Nonconformity occurring by using any other PROM programmers can not be supported. For the latest type of PROM programmers, contact the manufacturer to confirm whether it can be used for your product.

Table 5.1 Recommended PROM programmers

Manufacturer	Type name	Device name	Programming voltage (Vpp)
Advantest	R4945	M5M27C101 mode	12.5 V
	R4945A		

6. Memory Maps

Figure 6.1 shows memory maps of the MCU and the PROM programmer.

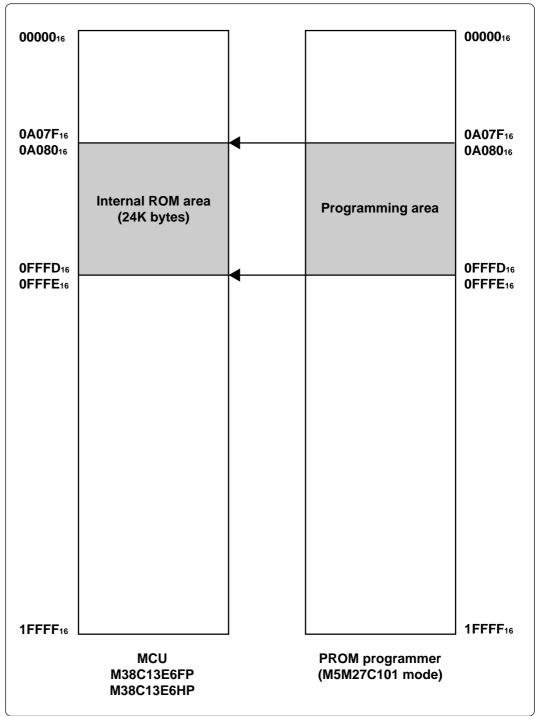|	MCU	PROM programmer
00000_{16}			00000_{16}
$0A07F_{16}$			$0A07F_{16}$
$0A080_{16}$	Internal ROM area (24K bytes)	Programming area	$0A080_{16}$
$0FFFD_{16}$			$0FFFD_{16}$
$0FFFE_{16}$			$0FFFE_{16}$
$1FFFF_{16}$	MCU M38C13E6FP M38C13E6HP	PROM programmer (M5M27C101 mode)	$1FFFF_{16}$

Figure 6.1 Memory map of M38C13E6FP/M38C13E6HP

7. Troubleshooting

The table below summarizes errors to be checked carefully before you determine them to be a fault.

7.1 Errors That Occur When Writing to ROM

7.1.1 When Newly Purchased

Cause	Remedy	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	9
	Is the MCU attached to the correct position?	9
PROM programmer	Is the area specification set correctly?	10
	Is the correct device selected?	10
Contact failure	The IC socket of the PROM programmer may be stained. The socket needs replacing.	-

7.1.2 Previously Written Normally

Cause	Remedy	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	9
	Is the MCU attached to the correct position?	9
PROM programmer	Is the area specification set correctly?	10
	Is the correct device selected?	10
Contact failure	The IC socket of the PROM programmer may be stained. The socket needs replacing.	-
	The PROM programmer connector at which the PROM programmer is contacted may be stained. Clean it with alcohol, etc.	-

7.2 MCU Does Not Function Normally

The program operates normally on the emulator, but when the MCU that has normally been written is attached the same program does not function normally.

(1) Is the offset address specified correctly when copying data into the PROM programmer?

(2) In the emulator, NOPs are often inserted in the area where the program has not been read, therefore the program happens to appear functioning normally even though it may have gone wild. Check your program again.

(3) The emulator and the actual MCU may differ in characteristics. Consult the user's manual of the emulation pod to check for differences in characteristics again.

7.3 Other Precautions

7.3.1 About the Recommended PROM Programmers

Not all PROM programmers available on the market can be checked to see if they function properly. There are several PROM programmers that we have verified to function properly. These products are listed as recommended PROM programmers in "5. Recommended PROM Programmers". Other PROM programmers may also be used providing that you verified them to function properly.

Note: No matter which type of PROM programmer you use, it is necessary to verify completion of programming by executing screening, etc. that are stipulated for each MCU used.

7.3.2 About Reading Out of Device Identification Code [1]

Please do not use the PROM programmer's device identification code readout function.

Using this function may break down the MCU. The device identification code is included in EPROM to indicate the manufacturer code and device code; it is not included in the MCU.

[1] Depending on PROM programmer manufacturers, this may be referred to by another name (e.g. ID code).

7.4 How to Request for Support

After checking this manual, fill in the following information and email to your local distributor.

For prompt response, please specify the following information:

(1) Contact address

- Company name
- Department
- Responsible person
- Phone number
- Fax number
- E-mail address

(2) Product information

- Name of the programming adapter
- Serial number
- Date of purchase
- Target MCU
- Symptoms (Fails blank check/Cannot write a program/Fails verification etc.)
- Detailed symptoms
- How often does the problem occur? (2 out of 10 etc.)
- When did the problem start to occur? (Since purchase/Used to work correctly)
- Type name of the PROM programmer (Advantest R4945A etc.)
- Specified device when writing to PROM (M27C101 etc.)
- Specified programming area when writing to PROM
- Switch settings of the adapter when writing to PROM

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Rev. 1.00
July 1, 2003
REJ10J0187-0100Z